National Science, Technology, Engineering, and Mathematics Education Digital Library (NSDL)

Program Solicitation

NSF-02-054

DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES
DIVISION OF UNDERGRADUATE EDUCATION

LETTER OF INTENT DUE DATE(S) (*optional*): March 13, 2002

FULL PROPOSAL DEADLINE(S): April 17, 2002

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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Title: National Science, Technology, Engineering, and Mathematics Education Digital Library (NSDL)

Synopsis of Program: Building on work supported under the multi-agency Digital Libraries Initiative, this program aims to establish a national digital library that will constitute an online network of learning environments and resources for science, technology, engineering, and mathematics (STEM) education at all levels. In FY2002, the program will accept proposals in three tracks: (1) *Collections* projects are expected to aggregate and manage a subset of the library's content within a coherent theme or specialty. (2) *Services* projects are expected to develop services which support users, collection providers, and the Core Integration effort and which enhance the impact, efficiency, and value of the library. (3) *Targeted Research* projects are expected to explore specific topics that have immediate applicability to collections, services, and other aspects of the development of the digital library.

Cognizant Program Officer(s):

- Dr. Lee L. Zia, Division of Undergraduate Education, telephone: 703-292-8671, e-mail: lzia@nsf.gov.

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.076 --- Education and Human Resources

ELIGIBILITY INFORMATION

- **Organization Limit:** None
- **PI Eligibility Limit:** An individual may serve as the Principal Investigator (PI) on no more than one proposal submitted in the FY2002 competition, but may serve as a co-PI on multiple proposals.
- **Limit on Number of Proposals:** None

AWARD INFORMATION

- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 30
- **Anticipated Funding Amount:** $25 million in FY2002, subject to the availability of funds

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is optional. Please see the full program announcement/solicitation for further information.
- **Full Proposals:** Supplemental Preparation Guidelines
    - The program announcement/solicitation contains supplements to the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full program announcement/solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full program announcement/solicitation for further information.

C. Deadline/Target Dates

- **Letters of Intent (*optional*):** March 13, 2002
- **Preliminary Proposals (*optional*):** None
- **Full Proposal Deadline Date(s):** April 17, 2002

D. FastLane Requirements

- **FastLane Submission:** Required
- **FastLane Contact(s):**
    - Ms. Antoinette Allen, Division of Undergraduate Education, telephone: 703-292-8671, e-mail: duefl@nsf.gov.
    - FastLane Help Desk, telephone: 1-800-673-6188 (toll free), e-mail: fastlane@nsf.gov.

PROPOSAL REVIEW INFORMATION

- **Merit Review Criteria:** National Science Board approved criteria apply.

AWARD ADMINISTRATION INFORMATION

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

I. INTRODUCTION

To catalyze and support continual improvements in the quality of science, technology, engineering, and mathematics (STEM) education, the National Science Foundation (NSF) has established the **National Science, Technology, Engineering, and Mathematics Education Digital Library (NSDL)** program. The resulting digital library, a network of learning environments and resources for STEM education, will ultimately meet the needs of students and teachers at all levels--K-12, undergraduate, graduate, and lifelong learning--in both individual and collaborative settings, as well as formal and informal modes. It will provide the premier portal to a rich array of current and future high-quality educational content and services, and also serve as a forum where resource users may become resource providers. For example, users might contribute their expertise to produce new teaching modules from resources such as real-time experimental data or visualization software available through the network. Or they might evaluate and report on the efficacy of specific digital learning objects (such as Java applets or interactive electronic notebooks) and their impact on student learning. Beyond providing traditional library services such as the intelligent retrieval of relevant information, indexing and online annotation of resources, and archiving of materials, the digital library will also enable users to access virtual collaborative work areas, hands-on laboratory experiences, tools for analysis and visualization, remote instruments, large databases of real-time or archived data, simulated or virtual environments, and other new capabilities as they emerge.

The NSDL program is fostering the creation and development of a comprehensive infrastructure, including a collaborative management process for the operation of the digital library, policies and practices for community-based review and other mechanisms for assuring the quality and usability of resources, policies and practices for collections management (including archiving, preservation, and deaccessioning), robust approaches to intellectual property management of resources that focus on maximizing the value of content, and standards that promote stability, interoperability, and reusability of a wide variety of learning objects. It is expected that the digital library established by the NSDL program will enable the dynamic use of materials and tools for learning supplied by cooperating providers of resource collections and services. Users will enjoy the synergies made possible by seamless access to different kinds of resources. For example, a case study at one site of how climate-change scientists employ satellite imagery to determine surface water chemistry could be combined with computational and visualization tools from another collection, and used to analyze and display archived data housed in yet another collection. In addition, services available through the library will increase the accessibility and impact of all resources, by supporting effective search and discovery of content, flexible assembly of curricular and learning modules from component pieces, and communication and collaboration among users.

This program builds on previously and currently funded work supported under the multi-agency Digital Libraries Initiative (DLI) Phase I and Phase II (see http://www.dli2.nsf.gov), and is intended to multiply the impact of efforts supported by NSF, other government agencies, the private sector, professional societies, and others working to improve STEM education nationwide. New projects funded under the NSDL program are expected to coordinate their developed collections and services with those of current NSDL projects and other digital library projects supporting education, such as the U.S. Department of Education's Gateway to Educational Materials (GEM) (http://www.thegateway.org) or projects supported by the Institute of Museum and Library Services (http://www.imls.gov). The extent of the NSDL program's impact will largely depend on the ability of funded projects to leverage related efforts and to achieve sustainability after the period of NSF funding.

The concept of a national digital library for educational resources in STEM disciplines has been developed through a series of workshops and related publications supported by NSF, including:

- *Information Technology: Its Impact on Undergraduate Education in Science, Mathematics, Engineering, and Technology,* April 1996, NSF 98-82 (http://www.nsf.gov/cgi-bin/getpub?nsf9882);
- *Developing a Digital National Library for Undergraduate Science, Mathematics, Engineering, and Technology Education*, August 1997, National Research Council, Center for Science, Mathematics, and Engineering Education (http://www.nap.edu/readingroom/enter2.cgi?0309059771.html);
- *Science, Mathematics, Engineering, and Technology Education Library Workshop*, July 1998, NSF 99-112 (http://www.dlib.org/smete/public/report.html);
- *Serving the Needs of Pre-College Science and Mathematics Education: Impact of a Digital National Library on Teacher Education and Practice*, September 1998, National Research Council, Center for Science, Mathematics, and Engineering Education (http://www.nap.edu/books/NI000781/html/);
- *Digital Libraries and Education Working Meeting*, January 1999 (http://www.dli2.nsf.gov/dljanmtg.pdf); and
- *Portal to the Future: A Digital Library for Earth System Education*, August 1999 (http://www.dlese.org/documents/reports/panelreports/reports.html).

Further information may be found at http://www.ehr.nsf.gov/ehr/due/programs/nsdl/, including links to abstracts of current and previous projects. It is important that new NSDL proposals be well-informed about relevant activities already funded under DLI and the NSDL program.

Although the purpose of the NSDL program is to support improvements in STEM education in the United States, it is recognized that the impact of the program has an increasingly important international dimension. Conversely, international digital library efforts may have potential impact on achieving the goals of the NSDL program. Consequently, proposals to this program may be part of a larger effort that includes international elements funded by other domestic sources or programs administered by other countries. (See http://www.dli2.nsf.gov/intl.html for further reference to potential international aspects.)

II. PROGRAM DESCRIPTION

In recent years, innovative projects supported by NSF and many other organizations have developed numerous examples of rich, learner-centered educational materials and environments. These feature a variety of advances, including the use of primary resources; computational tools for modeling, simulation, and visualization; remote access to scientific equipment; analysis of large, real-time or archived data sets; and network-supported collaboration. Modern information technologies--in particular, the World Wide Web--have shown great potential for supporting and conveying the very best of these new learning materials and environments. The highly linked, dynamic information architecture of the Web mirrors the interconnected nature of knowledge, promotes the integration of research and education, enables the inclusion of new high-quality materials and practices, and encourages learners to become active participants in expanding their educational experience.

However, the many Web-based collections of resources and other additional collections of educational material do exhibit shortcomings. It is often difficult to find high-quality and appropriate resources; resources that are located can exhibit uneven reliability or stability; and interoperability and reusability of learning resources are more promise than reality. Furthermore, the construction of new learning objects with executable content from "building block" component pieces (e.g., Java applets or application software macros) demands additional coordination requirements for seamless performance. Through the NSDL program, NSF seeks to enable the discovery, collection, organization, and delivery of quality teaching and learning resources appropriate for educators and learners at all levels. The resulting network of learning environments and resources will be managed actively to promote reliable "anytime, anywhere" access to content and services. In particular, the digital library should provide reusable, shareable, and interoperable resources that enable learners at all levels to access and use reviewed materials both within and across traditional STEM disciplinary boundaries. Such materials should also include assessment and evaluation tools and findings, and should harness new pedagogical content knowledge founded on a solid research base. The collections, digital rights management, and services of the library will facilitate the development and dissemination of new and tested materials and methods, thereby promoting continual improvements in STEM education at all levels.

To realize this vision, the NSDL program is currently supporting nearly 60 projects across three tracks: Collections, Services, and Targeted Research. In addition, the program is supporting a **Core Integration** effort, which was initiated through six pilot projects in FY2000 and continued through a single, large collaborative project awarded in FY2001. The mission of the Core Integration effort is to coordinate a distributed alliance of resource collection and service providers and to ensure reliable and extensible access to and usability of the resulting network of learning environments and resources. (For additional details about the nature of the Core Integration component of the NSDL program, see the NSDL program solicitation for FY2001, (NSF 01-55.) Full abstracts of the projects funded by the NSDL program are available at http://www.ehr.nsf.gov/ehr/due/programs/nsdl/.

In FY2002, the NSDL program will accept proposals in three tracks: (1) **Collections**, (2) **Services**, and (3) **Targeted Research**. These tracks are described below. Projects may have features that address more than one track. Awards for projects of up to 24 months in duration will be made. For expected award amounts and anticipated numbers of awards in the three tracks, see Section IV ("AWARD INFORMATION") below. In FY2002, the program will not accept new proposals in the Core Integration track.

Partnerships or collaborations are strongly encouraged among digital library stakeholders, such as K-12 schools, two-year colleges, four-year colleges, universities, professional societies, industrial and business concerns (including commercial publishers), and other non-profit and for-profit organizations.

Sustainability of projects beyond the period of NSF funding is expected, and proposals for collections and services should include a long-term management plan and other evidence of prospects for sustainability. Cost recovery and for-profit models are welcome. Proposed projects should have a tangible, long-term commitment from a stable institution. Sustainability is also often fostered through partnerships involving academic, business, government, and other organizations. The evaluation of a project's long-term management plan will be strongly informed by the goal of making the full library's resources available to potential users at a cost that will not limit their use.

The success of the NSDL program will depend, to a large extent, on the development of a collective sense of identity and common cause by all the projects. Because of the inherent synergy of efforts in all tracks, new awardees are expected to collaborate with one another and with previously funded projects, particularly the Core Integration effort. Likewise, the Core Integration effort has been charged to work with new and existing projects to cooperatively develop technical and organizational standards for including resource collections and services in the network. NSF expects that the results and approaches of projects in the Collections, Services, and Targeted Research tracks will influence the tasks of the Core Integration effort and how they are accomplished throughout the duration of the NSDL program and beyond. To facilitate interaction and establish linkages, regular Principal Investigator (PI) meetings and workshops will be held throughout the course of the NSDL program. (Representatives of related projects not funded by the NSDL program will also be invited to these meetings.)

Through the NSDL program, NSF expects that an early stage, operational digital library will be available for use by late 2002. Beyond this time, new releases will be developed through further funding to expand and enhance the evolving digital library's collections, services, and technology; and it is also anticipated that NSF will provide ongoing support for certain essential aspects of the digital library.

Collections Track

A project supported in this track is expected to aggregate and actively manage a subset of the digital library's content within a coherent theme or specialty. Responsibilities include the discovery of content, the provision of user services, classification and cataloguing, acquisition and/or linking, and referencing. While disciplinary-based themes or areas could define a natural corpus of content, other possibilities are encouraged as well. For example, collections could provide access to massive, real-time or archived data sets from a variety of areas of scientific inquiry; software tools for analysis, modeling, simulation, or visualization; remotely accessible experimental facilities; commentary by scientists, teachers, and experts in learning theory and pedagogy; or resources aimed at professional development for K-12 teachers. Other collections might specialize in providing rapid access to educational resources based on recent scientific advances or other current events, while still others might emphasize class-tested resources focusing broadly on science literacy. Linkages among different collections are particularly encouraged.

Collection development may necessitate modification of materials to take maximum advantage of the library's content. However, these collection development efforts are distinct from content development efforts supported by other NSF programs such as the Course, Curriculum, and Laboratory Improvement program, the Instructional Materials Development program, and other curriculum and materials development programs funded by NSF or other agencies. Similarly, proposals that are primarily digitization projects are not appropriate for the NSDL program.

Collection providers are expected to exploit the potential of information technologies and digital library research to create and support rich learning environments. Proposals should include evidence that the proposed aggregation of resources will support the very best STEM education at all levels--education that is inquiry-driven, active, and engaging. Proposals should also address criteria and mechanisms for acquiring and selecting high-quality content; for active archiving that maintains the usability of content as the underlying hardware, operating systems, and software evolve; and for maintaining currency. Proposals should include a management plan that addresses long-term sustainability.

Collection providers are expected to participate with other NSDL projects in the development and adoption of minimal standards for interoperability, reusability, reliability, and stability of resources and services. In particular, basic metadata requirements are needed to support flexible browsing and targeted searches across distributed collections. In this regard, projects in this track are expected to establish and maintain close interaction with each other and with the Core Integration effort.

Because it is anticipated that projects developed in this track will be included in the alliance of resource collection providers comprising the ultimate digital library, the projects are expected to cooperate closely, both among themselves and with the Core Integration effort. Nonetheless, they may pursue a variety of approaches to collection selection or development, and their coverage may have different areas of strength. Collections not supported by the NSDL program are encouraged to work with the Core Integration effort at any time, but the full integration of these collections into the library will primarily be emphasized during FY2003.

Services Track

Projects supported in this track are expected to develop services to increase the impact, reach, efficiency, and value of the digital library in its fully operational form. Services that will have a broad impact across an array of other NSDL projects are particularly encouraged. Although some examples are given below, many valuable services may be unanticipated. Since there are natural synergies to exploit between digital library collections and services, projects are strongly encouraged to collaborate with appropriate projects in the Collections track, if not at the proposal stage, then certainly during the course of funding.

Services supporting *users* might include:

- help services such as 800 numbers, frequently asked questions (FAQs), rapid response e-mail, etc.;
- targeted assistance to students and teachers at K-12 schools or colleges having limited computer capability and technical support;
- methods to increase the library's usability for special populations such as young children or other users having limited experience with computer technology;
- synchronous and asynchronous mechanisms for collaborative learning environments using shared resources;
- mechanisms for building personal annotated digital information spaces;
- mechanisms to help content developers combine resources by different authors and from different collections; and
- "push" or "pull" mechanisms for reaching users.

Services supporting *collection providers* might include:

- peer review mechanisms for quality assurance;
- reliability testing for Java applets or other software-based resources;
- certification that resources are interoperable across platforms;
- provision of cataloging tools;
- high-volume servers that can handle periods of peak demand;
- "middleware" to support acquisition and incorporation of content from different sources;
- mechanisms supporting searches across multiple attributes;
- audio, image, and video search capabilities;
- mechanisms for associating commentary and other annotations with resources; and
- mechanisms for determining usage patterns.

Services supporting the *Core Integration* effort might include:

- maintainance of an editorial "help desk" presence on the network;
- content-based searching;
- metadata system translation or crosswalking;
- maintenance of personal user profile systems that respect privacy issues;
- provision of user reports and other commentary associated with content;
- community feedback mechanisms, both passive and active;
- citation analysis;
- classification and organization;
- latent semantic analysis; and
- digital library evaluation metrics.

Proposals submitted to the Services track should also include a management plan that addresses long-term sustainability.

Targeted Research Track

Projects supported in this track should have direct applicability to one or both of the other two tracks or to the Core Integration effort. Examples include, but are not limited to:

- digital library usage studies;
- research on building and sustaining user communities within the context of the digital library;
- automated annotation of audio, image, or video resources;
- user interface implementation issues;
- identification and usage of principles of information architecture design;
- rendering expertise embedded in high-quality but static paper-based educational resources into interactive, digital formats;
- use of expert system principles to capture human librarians' experience, knowledge, and practice;
- applications of simulation or virtual world technology for virtual assistants; and
- research on uses of digital libraries to improve learning by students at all levels.

Proposals for basic or general-purpose digital library research or basic or general-purpose research in the use of technology in education may be supported by the multi-agency Digital Libraries Initiative (http://www.dli2.nsf.gov), the Information Technology Research (ITR) program (http://www.itr.nsf.gov), or other programs.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the *Grant Proposal Guide* (see Chapter I, Section C) are eligible to submit proposals under this program solicitation. An individual may serve as the Principal Investigator (PI) on no more than one proposal submitted in the FY2002 competition, but may serve as a co-PI on multiple proposals.

IV. AWARD INFORMATION

NSF anticipates that approximately $25 million will be available for this program in FY2002. The program expects to make approximately 30 awards, depending on the quality of proposals received. The anticipated distribution of awards in the program's three tracks is as follows:

- *Collections:* 12 to 15 new awards, up to $1,000,000 each;
- *Services:* 9 to 12 new awards, up to $500,000 each;
- *Targeted Research:* 6 to 8 new awards, up to $500,000 each.

Awards may have a duration of up to 24 months. The estimated program budget, number of awards, and average award size and duration are subject to the availability of funds.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent: A brief letter of intent (sent via e-mail to due-nsdl-program@nsf.gov) is requested, but not required, by March 13, 2002. Please indicate clearly the track of the program that the prospective proposal will address.

Full Proposal:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Web Site at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

FastLane (http://www.fastlane.nsf.gov), NSF's system for conducting business over the Internet, must be used to prepare and submit proposals. Paper proposals will not be accepted. Proposers should carefully follow the detailed instructions (http://www.fastlane.nsf.gov/a1/newstan.htm) on the FastLane Web site. PIs who have not used FastLane before are reminded to make sure that their institution is a registered FastLane institution (see http://www.fastlane.nsf.gov/a0/about/registration.htm) and to contact the institution's Sponsored Research Office (SRO) to be added to the NSF PI database. (All co-PIs listed in the proposal must also be in the NSF PI database.) PIs who intend to use subawards in their proposal (see GPG, Chapter II, Section C.6.f(v)) are reminded that the subawardee organization(s) must also have an NSF Institution ID Number (or be a registered FastLane institution) before FastLane can be used to prepare the subaward budget(s). *New FastLane users should acquaint themselves with the system as early as possible--well before the proposal deadline.*

A Project Data Form must be submitted (via FastLane) as part of all proposals. The information on this form is used to direct proposals to appropriate reviewers and to determine the characteristics of projects supported by the Division of Undergraduate Education. In FastLane, this form will show up in the list of forms for your proposal only after you have (1) selected the correct Program Announcement/Solicitation No. on the Cover Sheet and (2) saved the Cover Sheet. Take special care to identify the proper track for your proposal in Item 1 of the form.

A Budget Justification of up to three pages *must* accompany the budget forms and provide details about budget line items. Proposals that involve subawards should include a Budget Justification of up to three pages for each subawardee organization.

If Special Information or Supplementary Documentation is included with the proposal (see GPG, Chapter II, Section C.9), this section should be submitted as one or more PDF files using FastLane's "Supplementary Documents" function. (Paper documents should be electronically scanned and converted to PDF.) This optional section may include *only* the sorts of items listed in the GPG.

Organizations intending to submit simultaneous Collaborative Proposals (as described in GPG, Chapter II, Section C.11.b) must alert an NSDL program officer by e-mail (due-nsdl-program@nsf.gov) prior to the submission and must follow the instructions for electronic submission specified in GPG, Chapter II, Section C.11.b(ii). The project titles of the related proposals must be identical and must begin with the words "Collaborative Project," and the *combined* budgets of the related proposals should conform to the anticipated individual award sizes specified for the program's three tracks in Section IV ("AWARD INFORMATION") above. These simultaneous Collaborative Proposals will be treated as a single proposal (with a single Project Summary, Project Description, and References Cited) during the review process.

Proposers are reminded to identify the program solicitation number (NSF-02-054) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost sharing is not required in proposals submitted under this Program Solicitation.

Other Budgetary Limitations: Anticipated maximum award sizes for the program's three tracks are specified in Section IV ("AWARD INFORMATION") of the program solicitation.

C. Deadline/Target Dates

Proposals must be submitted by the following date(s):

Letters of Intent (*optional*): March 13, 2002
Full Proposals *by 5:00 PM local time*: April 17, 2002

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this Program Solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: http://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call 1-800-673-6188 or e-mail fastlane@nsf.gov.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane website at: http://www.fastlane.nsf.gov.

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The two merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgements.

What is the intellectual merit of the proposed activity?
How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?
How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education
One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities
Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 70 percent of proposals. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at its own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1)* or Federal Demonstration Partnership (FDP) Terms and Conditions;* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Web site at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Web site at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Web site at http://www.gpo.gov.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding National Science, Technology, Engineering, and Mathematics Education Digital Library should be made to:

- Dr. Lee L. Zia, Division of Undergraduate Education, telephone: 703-292-8671, e-mail: lzia@nsf.gov.

For questions related to the use of FastLane, contact:

- Ms. Antoinette Allen, Division of Undergraduate Education, telephone: 703-292-8671, e-mail: duefl@nsf.gov.
- FastLane Help Desk, telephone: 1-800-673-6188 (toll free), e-mail: fastlane@nsf.gov.

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF web site at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

The Division of Undergraduate Education has compiled a short list of other funding opportunities for undergraduate science, technology, engineering, and mathematics education, which can be found on the Web at http://www.ehr.nsf.gov/ehr/due/links/other_programs.asp.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement/solicitation for further information.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090, FIRS at 1-800-877-8339.

The National Science Foundation is committed to making all of the information we publish easy to understand. If you have a suggestion about how to improve the clarity of this document or other NSF-published materials, please contact us at plainlanguage@nsf.gov.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Pursuant to 5 CFR 1320.5(b), an agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Information Dissemination Branch, Division of Administrative Services, National Science Foundation, Arlington, VA 22230, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 17th Street, N.W. Room 10235, Washington, D.C. 20503.

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